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Options Trading: Is It for Farmers?

No More Food for Crude page 12

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PERSPECTIVES

LAST YEAR, AMERICANS SPENT $312 BILLION FOR FOODS produced on U.S. farms. That came to $13 billion, or about 4 percent, more than 1982's food bill and included purchases in both stores and away-from-home eating places. Finding stable and sometimes lower prices, consumers bought more of many foods, particularly red meats and fresh fruits. These facts, and the ones that follow, are from a report by economist Denis Dunham of USDA's Economic Research Service. "What's Happening to Food Costs" looks at cost trends in the food marketing chain from farm to table.

Farmers earned about $84 billion, or 27 percent, of 1983's expenditures for these foods, nearly the same amount as received in 1982. The real increase in the food bill came from marketing costs—which rose $12 billion in 1983—and accounted for nearly the entire spending rise over 1982.

About half of the $12 billion increase in the marketing bill came from labor costs, which climbed 6 percent to $103 billion in 1983. Labor costs came to one-third of total consumer food spending and were more than one-fifth larger than the farm value. These increases occurred at a time when economic conditions were holding down the wages of food industry workers. Because of the recession and intensified market competition, retail foodstore clerks and some meatcutters had to settle for much smaller wage increases. For some workers, wage freezes were imposed in the first year of newly-signed union contracts. Other workers, particularly in the meatpacking industry, accepted reduced wages and benefits in order to help their companies and continue working.

Food industry profits were higher in 1983. Based on the first 9 months of 1983, after-tax profits of food manufacturers were 3.1 percent of sales, up from 2.9 percent in 1982. Those of food chains rose to 1 percent, up from 0.8 percent in 1982. Dunham suggests that "when combined with profit margins for wholesalers and restaurants, corporate profits before taxes earned by the food industry in 1983 were about $14 billion or 4.5 percent of consumer food spending."

Dunham draws the conclusion that "we are still improving our standard of living because a declining proportion of our income is required for food, which leaves more money for other things. In 1983, Americans spent slightly less than 16 percent of total personal disposable income on food, the lowest percentage on record. This share compares with 16.2 percent 10 years ago, and 18.7 percent 20 years ago." Dunham notes these percentages differed among income groups. Low-income persons spent proportionally more on food and higher-income consumers spent proportionately less.

The forecast for 1984 is higher food prices. Analysts are saying that food prices will rise 4 to 7 percent for the year, with prices going up throughout the year.

That should more than double 1983's food price inflation rate of 2.1 percent (as measured by the food component of the Consumer Price Index), the smallest rise since 1967. The 1983 rate almost halved the 4-percent increase in 1982 and was one-fourth of the 1981 rate. And for the fifth consecutive year, food prices increased less than other prices. Major reasons for the slowdown: abundant food supplies, a slower rise in marketing costs, and little increase in prices for imported foods and fish.

Lower farm values held down retail prices, although some farmers fared better than others, depending on what they were selling. Livestock prices went down, egg and poultry prices rose. Overall, however, the farmer received lower prices, according to USDA calculations of the farm value of a "market basket" of foods. Largely because of lower returns for hogs and fresh fruit, the farm value of the entire market basket declined 2.2 percent from 1982.

FARMLINE

AGRICULTURE . . . NATURAL RESOURCES . . . RURAL DEVELOPMENT
Practical economic intelligence from USDA's Economic Research Service

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Farmers will soon have a new tool available for dealing with price uncertainties: agricultural options. Options will allow farmers to lock onto a guaranteed price in selling their output or purchasing certain inputs, but without some of the risks of futures contracts. Here's a preview of ag options—how they work, when they pay off, and what to consider before getting involved.

Responding to Jojoba's Lure *by Martha R. Evans* 10

Separating promise from reality—that's one of the challenges facing a farmer tempted to respond to jojoba's lure. The promises make the perennial desert shrub sound like a budding giant. The realities could nip the developing jojoba industry in the bud. For producers, it's a gamble, but some are betting the farm on jojoba's success.

Fewer Barrels, Fewer Bushels Travel U.S.-Mideast Routes *by Doug Martinez* 12

The days of U.S. food for Mideast crude may be over. Mideast OPEC provided only 4% of the petroleum used in the United States last year, and U.S. farm products accounted for just 5% of the food imported by Mideast OPEC nations. Both figures were well below 1977 levels. What happened to the burgeoning oil-food connection? Economist John Parker provides some answers.

Transition Times for Farm Machinery *by Carlos Sisco* 13

More tractors should roll off the lots this year, but 4 years of declining sales have left their mark. Some manufacturers and dealers are still struggling with red ink, and the entire farm machinery industry is going through a trying transition. In the years ahead, further adjustments will probably be necessary to cope with changing farm economics and farm structure.

Organically Speaking, Western Europe Is Top Seed *by Stephen Sposato* 16

The influence of organic farming on retailing and consumer attitudes is fairly widespread in Europe and has been increasing in the last 15 years. Europe has a longer history of organic farming than the United States, a more compatible farm structure, a more advanced marketing system for organic foods, and many well-established "schools" of organic farming.

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Options Trading: Is It for Farmers?

Farmers will soon have a new tool available for dealing with price uncertainties: agricultural options.

Trading in agricultural commodity options is expected to begin this fall after nearly a 50-year ban. Options will allow farmers to lock onto a guaranteed price in selling their output or purchasing certain inputs, but without some of the risks of trading in futures contracts.

"If you purchase an option," says David Kenyon, "you know your financial liability in advance, you are not subject to margin calls, and you do not forfeit the opportunity to take advantage of favorable price shifts in the cash market that may occur before your option expires."

The difference between options and futures is one of the subjects covered by Kenyon in his *Farmers' Guide to Trading Agricultural Commodity Options.* Kenyon, a professor of agricultural economics at Virginia Polytechnic Institute and State University, wrote the guide while on a study-research assignment with USDA's Economic Research Service.

According to Kenyon, options may provide an attractive alternative for farmers who have backed off from hedging only because of the risks present in the futures market. He cautions, however, that rules for options trading are still being written, that options can be expensive, and that average returns may not match those available from futures. Farmers should carefully investigate options and get professional advice before making any trading decisions.

Options trading in gold, Treasury bonds, and sugar began in October 1982. Options for several major U.S. farm commodities should be available before the end of this year. Under a 3-year pilot program, the Chicago Board of Trade, Chicago Mercantile Exchange, Kansas City Board of Trade, and other approved exchanges will each be permitted to write option contracts on two commodities. Options may initially be offered on corn, soybeans, wheat, fed cattle, hogs, and possibly some other commodities that already trade on futures markets.

What's an Option?

An option, says Kenyon, is a contract that gives you the right, but not the obligation, to buy or sell a futures contract at a specified price until the option expires. Once you lock in a price by purchasing an option, you can exercise your option to buy or sell at that price regardless of any later changes in the price of the futures contract.

The right to sell at a fixed price is called a *put option;* the right to buy at a fixed price is a *call option.*

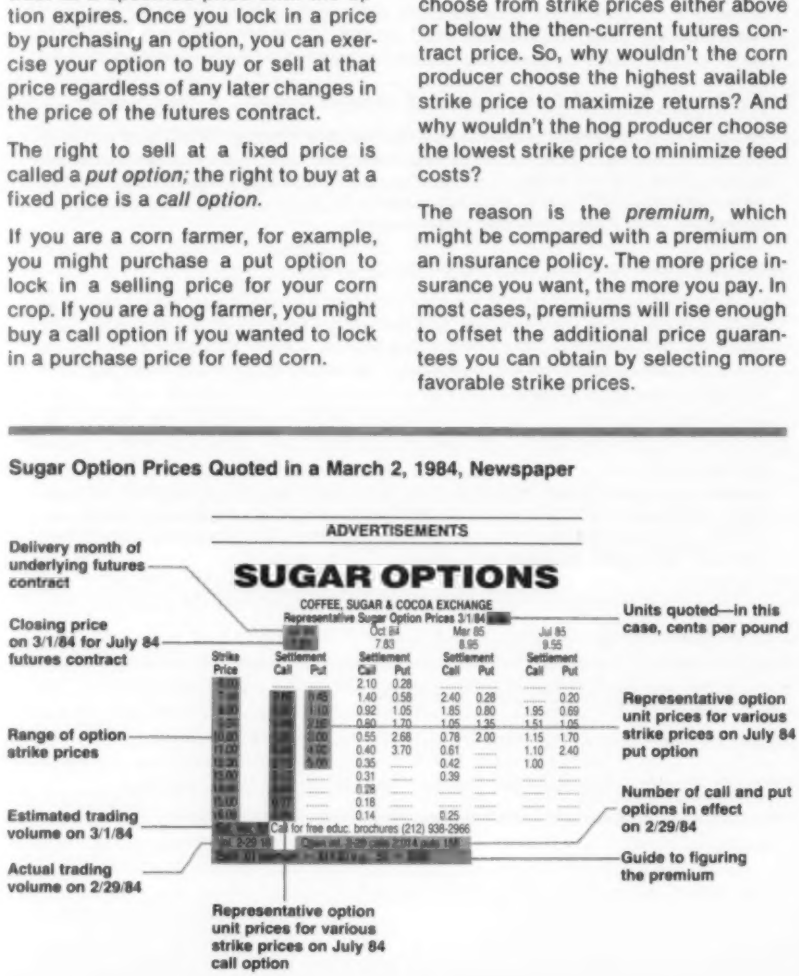
If you are a corn farmer, for example, you might purchase a put option to lock in a selling price for your corn crop. If you are a hog farmer, you might buy a call option if you wanted to lock in a purchase price for feed corn.

In either case, you would choose a price from several alternative *strike prices* available at the exchange offering the option contracts. This is the price you would be locking in—the price at which you could exercise your option to buy or sell futures. It does not have to match the underlying futures contract price at the time you purchase the option.

In fact, the option buyer will be able to choose from strike prices either above or below the then-current futures contract price. So, why wouldn't the corn producer choose the highest available strike price to maximize returns? And why wouldn't the hog producer choose the lowest strike price to minimize feed costs?

The reason is the *premium,* which might be compared with a premium on an insurance policy. The more price insurance you want, the more you pay. In most cases, premiums will rise enough to offset the additional price guarantees you can obtain by selecting more favorable strike prices.

Sugar Option Prices Quoted in a March 2, 1984, Newspaper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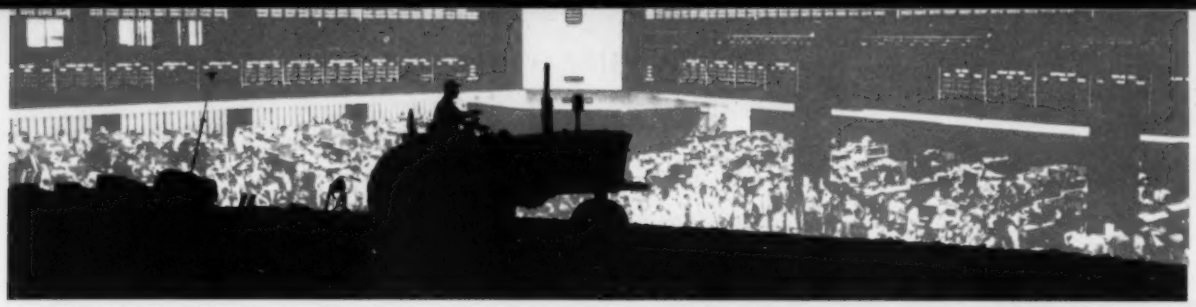

Figuring the Premium
Premiums are calculated from option unit prices. For each strike price available to the buyer of an option contract, there will be an associated transaction price, called the option price or option unit price.

The buyer of a put option—like the corn producer—will find that the unit price rises as the strike price rises. The buyer of a call option—like the hog producer—will find that the unit price rises as the strike price drops.

Option unit prices may fluctuate throughout the trading day as the value of the underlying futures contract changes and as option buyers and sellers adjust their bid and asking prices based on supply and demand.

The premium you pay is the option unit price multiplied by the number of units (bushels or whatever) in the futures contract. Thus, a unit price of 20 cents per bushel of corn translates into a premium of $1,000 for an option on a 5,000-bushel futures contract.

If a 20-cent unit price were attached to a strike price of $3.00 per bushel on a put option, the corn farmer might have to pay somewhere around 30 to 35 cents per bushel—a premium of $1,500 to $1,750—to lock in a strike price of $3.10 per bushel.

Here's How It All Might Work
Assume that corn options will be offered by next year, and you're a corn farmer watching the options market as you begin your spring planting. Let's say a $3.00-a-bushel strike price is available at a 20-cent unit price on a put option for December 1985 corn. You see this as an opportunity to lock in a $2.60-a-bushel floor price for your crop—the $3.00 strike price minus the 20-cent unit price minus another 20 cents for the basis (the difference between futures and cash prices in your area).

You're afraid that corn prices might drop below $2.60 in the cash market by the time you harvest your crop in October, and you figure that $2.60 would be enough to cover your production costs and still provide a small profit. You pay your premium, plus a brokerage commission.

After that, you can exercise your right to sell for $3.00 any time up to the expiration date of your options contract. Options contracts will probably expire about 2 weeks before the last delivery day of the futures contract.

Now, suppose that December corn futures are down to around $2.20 per bushel in October, and you decide to exercise your option. You might instruct your broker to assign you a long (buy) position on the futures market near the end of the trading session and to immediately exercise your option. Your broker calls the exchange and, after the end of the trading day, a clearing corporation acts on your "exercise" request by assigning you a short (sell) position in futures. This offsets the long position you took during the trading session. Your option is exercised, and your futures position is simultaneously terminated—all before trading resumes the next morning.

What happened? You bought a futures contract at that day's price of around $2.20 a bushel, and you sold the contract by exercising your option at your locked-in strike price of $3.00 a bushel. Your profit: 80 cents a bushel, minus the 20-cent option unit price already paid in the premium. If you can sell your corn in the cash market for around $2.00 a bushel, you've managed to net your $2.60 per bushel floor price—$2.00 in the cash market, plus around 60 cents because of your options transaction.

Your insurance paid off. You did much better than you would have done in the cash market alone, where you would have netted only $2.00 a bushel.

The Other Direction
How would you have fared had corn prices gone up instead of down between spring and fall?

Kenyon uses the example of December corn futures reaching $3.50 a bushel. If you held a futures contract—rather than an option—to sell your corn at around $3.00, you would either have to deliver your corn at that price or, more likely, you would buy out of the contract at $3.50—a 50-cent loss on your futures transaction. That loss would offset your gain in the cash market.

The options contract offers a better alternative. You could simply let the option expire and sell your corn in the cash market for the higher price. You would still lose your premium, which amounts to 20 cents a bushel, but you come out well ahead of where you would have been had you hedged in the futures market. In this instance, the cash market—without options or futures—would have provided the highest returns, although you would have taken the risk that prices might fall.

Notice that with both options and futures, you successfully locked in a floor price. The difference, says Kenyon, is that options allow much higher profits if prices go in your direction.

The same results, in reverse, would apply if you were a hog producer trying to lock in a ceiling on costs for feed corn. A call option could protect you from rising corn prices without locking you into a futures contract if corn prices fell sharply.

Comparing Options and Futures
Although the chance to benefit from favorable price movements is a key advantage of options, there are many other considerations in weighing options against futures. Among the most important may be relative earnings.

Kenyon constructed several examples to compare returns. In his examples, he found that returns from futures hedging are higher than returns from options under some price scenarios, but

much depends on the direction of price movement and the size of the option premium.

The degree to which farmers will use options will be heavily influenced by the premiums, he says. The corn farmer's option in the previous example would look less appealing if the option unit price were 35 cents a bushel instead of 20 cents. A higher premium would set a lower floor price, and it would cut deeper into potential gains if cash prices rose between spring and fall.

Option grantors (those who sell options) demand higher premiums to offset increased risks. Like sellers of insurance, they try to make sure that, overall, their premiums cover their payouts when futures markets provide profits to option buyers. When prices go in their favor, option sellers keep the premiums as payment for providing option buyers with price insurance.

Even as option buyers, he says, farmers may not view premiums as tipping the scales against the options strategy. At least, premiums are known up front, and they constitute the entire financial liability of the option buyer, other than brokerage fees.

Purchasers of options do not have to meet margin calls. Holders of futures contracts, as well as sellers of options, do have to meet margin calls to put up additional cash if futures prices go against them.

Other Advantages, Too

He also points out that options may offer a more attractive price management tool when yield risk is considered. A farmer hedging in futures usually has to consider the possibility that yields may not match expectations.

If the farmer hedges an entire crop based on normal yields, losses in the futures market can be relatively high if poor weather cuts yields and boosts prices.

You know your financial liability in advance, and you can take advantage of favorable swings in the cash market.

With options, on the other hand, the farmer can obtain price protection on the entire crop without the risk of being locked into a futures contract that may, under some circumstances, substantially reduce net returns. If yield is lower than expected and price is higher, the option buyer simply allows the option to expire, losing only the premium.

Options, says Kenyon, can be bought and sold on any business day, so farmers can buy or sell price insurance as they need it. And an option buyer does not even have to exercise the option in the futures market in order to realize a profit. The trader can liquidate the option position by making an offsetting option trade, possibly recapturing part of the premium.

"Selling an option at harvest returns the same or more profit than exercising the option and avoids trading the underlying futures contract. Hence," says Kenyon, "more option buyers will choose to sell rather than exercise their options position."

Kenyon notes that the history of options trading has been tainted by a few unscrupulous brokers and some deceptive trade practices. That's one reason, he says, why the Commodity Futures Trading Commission (CFTC) is proceeding slowly and carefully in designing the pilot program for agricultural options.

The best policy, however, is still "buyer beware," Kenyon advises. "Farmers should be careful in dealing with those who promise enormous profits." Check out such deals with local brokers who have established reputations or with the CFTC, he says. Also, be aware that commissions charged by brokers may vary both in the manner in which they are charged and in the size of the fee. Ask about the fee structure before choosing a broker. □

*[David Kenyon's **Farmers' Guide to Trading Agricultural Commodity Options** will soon be available from the U.S. Government Printing Office. Look for ordering information and price in the next issue of **FARMLINE.**]*

Important Terms in Options Trading

Call option: The right, but not the obligation, to buy a futures contract at a specified price during a specified time period.

Put option: The right, but not the obligation, to sell a futures contract at a specified price during a specified time period.

Premium: The amount an options buyer pays the options grantor for the option.

Strike price: The price at which the option can be exercised—the price at which the futures position is established in case of exercise.

Exercise: The process by which the owner of the option converts the option into a futures position.

Writer or grantor: A person who sells options.

Basis: Historical difference between the local cash price and the price of the near-term futures contract.

Expiration date: The day when the owner of the option loses the right to exercise the option; the day the option ceases to exist.

Comparing Returns: Two Examples of Options Versus Futures Versus Cash Markets

EXAMPLE I. Corn prices drop from spring to fall

Assumptions

Futures price at time of hedge:	$3.00 per bushel
Selected strike price:	$3.00 per bushel
Option unit price:	$0.20 per bushel
October futures price:	$2.20 per bushel
October cash price:	$2.00 per bushel
Corn production on farm:	10,000 bushels

EXAMPLE II. Corn prices rise from spring to fall

Assumptions

Futures price at time of hedge:	$3.00 per bushel
Selected strike price:	$3.00 per bushel
Option unit price:	$0.20 per bushel
October futures price:	$3.50 per bushel
October cash price:	$3.30 per bushel
Corn production on farm:	10,000 bushels

Strategy A—Buy Put Options on Two December Corn Futures Contracts (10,000 Bushels)

Return on futures from exercise of put options:

Sell two 5,000-bushel contracts at $3.00 strike price =	$30,000
Buy back two 5,000-bushel contracts at $2.20 October price =	−$22,000
Earnings on put options =	$8,000
Premium on two put options (10,000 bushels × 20¢ unit price) =	−$2,000
Net earnings on put options =	$6,000*
Receipts from sale on cash market: 10,000 bushels × $2.00 cash price =	+$20,000
Net earnings: $6,000 in futures + $20,000 in cash market =	$26,000

Allow options to expire:

Earnings/losses on put options =	0
Premium on put options (10,000 bushels × 20¢ unit price) =	−$2,000
Net losses on put options =	−$2,000*
Receipts from sale on cash market: 10,000 bushels × $3.30 cash price =	+$33,000
Net earnings: $33,000 in cash market minus $2,000 loss on put options =	$31,000

Strategy B—Sell One December Corn Futures Contract (5,000 Bushels) To Hedge Half Your Expected Crop[1]

Return on futures:

Sell 5,000-bushel contract at $3.00 futures hedge price =	$15,000
Buy back 5,000-bushel contract at $2.20 October price =	−$11,000
Net earnings on futures hedge =	$4,000*
Receipts from sale on cash market: 10,000 bushels × $2.00 cash price =	+$20,000
Net earnings: $4,000 in futures + $20,000 in cash market =	$24,000

Return on futures:

Sell 5,000-bushel contract at $3.00 futures hedge price =	$15,000
Buy back 5,000-bushel contract at $3.50 October price =	−$17,500
Losses on futures hedge =	−$2,500*
Receipts from sale on cash market: 10,000 bushels × $3.30 cash price =	+$33,000
Net earnings: $33,000 in cash market minus $2,500 loss on futures hedge =	$30,500

Strategy C—Sell Corn in Cash Market (No Futures Hedge or Option)

Net earnings: 10,000 bushels × $2.00 cash price =	$20,000
Net earnings: 10,000 bushels × $3.30 cash price =	$33,000

[1]Hedging the entire crop through futures would have resulted in net earnings of $28,000 in both the examples. However, this assumes fixed yields. In practice, most farmers would be unlikely to hedge an entire crop before they had some assurance that yields would match expectations.
*Minus brokerage commissions.

To keep the comparisons relatively simple, the strategy of offsetting rather than exercising the option is not illustrated here. In many cases, this would increase the returns available through options.

AGRICULTURAL ROUNDUP

Gleanings

Domino effect in an integrated world economy . . . "In the 1970's, the whole world was on an inflationary fast track, a kind of economic pyramiding that had to keep growing or collapse. The U.S. recession, deepened by our attempts to get inflation under control, may have punctured the balloon. In an integrated world economy, the slowing of growth in a major nation such as the United States has a domino effect, first on our major trading partners and then on the rest of the world. Slowed growth in the developed world meant sharp reductions in OPEC oil exports, which not only reduced OPEC's ability to import but also eliminated a major source of credit for financing development in the rest of the world."

. . . the result: a global recession that fed on itself. "The slowdown in the global economy concurrent with the slowdown in credit flows left many East European and Latin American countries in untenable debt positions. The threat of debt payment defaults further discouraged both private credit and credit from governments and institutions such as the World Bank. Countries short of foreign exchange necessary to meet debt payments acted to sharply curtail all but essential imports. All these logical actions and reactions caused the global recession to feed on itself." —economist John Lee, administrator of the Economic Research Service.

Lighting up less . . . Americans smoked an estimated 603 billion cigarettes in 1983, the smallest number since 1974, according to USDA economist Verner Grise. Just 3 years ago, U.S. cigarette consumption reached an all-time high of 640 billion after fairly steady increases for more than 10 years. Sharp rises in cigarette taxes and prices are seen as the major reason for the recent declines, but health concerns continue to have a market impact.

. . . ever since the 1964 Surgeon General's report on smoking and health, per capita cigarette consumption has been trending downward. Because the number of smokers grew along with the U.S. population, Americans still puffed about 80 billion more cigarettes in 1983 than in 1963. But average consumption per person (based on the total 18-and-over population) had dropped below 3,600 cigarettes by 1983, compared with 1963's record of 4,345. Health concerns are also evident in the switch to reduced tar and nicotine brands. Low tar and nicotine cigarettes accounted for an estimated 53 percent of sales last year—down from 58–59 percent in 1981 and 1982 but substantially above their 7-percent average market share in the early 1970's.

More red meat on the table . . . The average American added an extra 1½ pounds of beef and 3 more pounds of pork to the 1983 menu, according to economist Ronald Gustafson, livestock analyst with USDA's Economic Research Service. Large red meat supplies and price discounts were the reason. According to recent estimates, beef eating rose to 78.8 pounds (retail weight) per person in 1983. That's the highest figure since 1978, though nowhere near the 94.4-pound record in 1976 when producers were liquidating their herds. Pork consumption is estimated to have climbed to 62.3 pounds, up from 59.1 in 1982 but well below 1980 and 1981 figures of 68 and 65 pounds, respectively. Total red meat consumption—adding in veal, lamb, and mutton—reached 144 pounds per person, a 5-pound gain from 1982.

. . . gains for red meats did not come at poultry's expense. Poultry consumption set a record for the eighth year in a row, climbing to an estimated 65.5 pounds per person. That included more than 51 pounds of broilers, 3 pounds of other chicken, and 11 pounds of turkey. Current forecasts indicate that per capita poultry consumption might decline a few tenths of a pound this year. Producers are expected to boost output, but not until the second half of the year and not enough to keep up with population growth. Meanwhile, beef and pork production may drop from 1983's level. Smaller supplies of red meats will reflect the breeding herd reductions of 1983, when large supplies led to lower livestock prices, and drought led to higher feeding costs and poor forage conditions.

Leaders

. . . in World Crude Oil Production[1]

	1982	1983[2]	Share of world total, 1983[2]
	mil. barrels per day		
Soviet Union	12.26	12.38	23.8%
United States	8.66	8.63	16.6%
Saudi Arabia	6.48	4.50	8.7%
Mexico	2.72	2.74	5.3%
Iran	1.91	2.13	4.1%
China	2.00	2.05	3.9%
United Kingdom	2.06	2.04	3.9%
Venezuela	1.85	1.65	3.2%
Nigeria	1.30	1.53	2.9%
Indonesia	1.35	1.44	2.8%
Canada	1.24	1.23	2.4%
Libya	1.16	1.08	2.1%
All others	10.20	10.60	20.4%
World total	53.19	52.00	100.0%

[1] Excluding natural gas liquids. [2] Estimated.

Dollar's Gain Is Exports' Loss

The U.S. dollar's strength against foreign currencies since 1980 has had the same effect as an export tax—it has raised the world market price of American products and reduced the demand for U.S. exports.

The impact of exchange rate fluctuations on U.S. farm trade is examined in a recent report by USDA economist Art Morey and Australian analyst Jim Longmire. They conclude that the changing value of the dollar has been a key trade variable.

As the dollar dropped in value during the 1970's, U.S. farm exports boomed, and idled acreage was shifted into crop production. Then, as the dollar climbed in value in the early 1980's, the boom ended. U.S. farm exports slumped and government stocks of surplus production grew.

Morey and Longmire estimate that the United States lost a total of about $3 billion in export sales of wheat, corn, and soybeans during 1981 and 1982 because of the strengthening dollar. In volume, the loss amounted to 16 million tons.

At least two important conclusions emerge from their study:

- Export promotion and subsidized credit programs to encourage export sales may not be capable of offsetting the negative trade impact of U.S. economic policies that bolster the foreign exchange value of the dollar.

- A stronger dollar tends to shift grain away from farm exports and into domestic farm stocks unless farm price supports can be adjusted downward when needed to keep U.S. grain prices at competitive world market levels.

Strong Dollar Dampens Demand for U.S. Farm Exports, by Jim Longmire and Art Morey. (Published December 1983; 31 pages; GPO Stock No. 001-000-04395-1; $2.25.)

To Till Or Not To Till?

Many farmers have switched from traditional tillage practices to reduced-till and no-till strategies in an attempt to protect their soil and increase their returns by reducing labor, machinery, and fuel expenditures.

Have they succeeded? Analysts Michael Hanthorn and Michael Duffy tackle part of the question. They focus on comparative returns to determine whether short run economic incentives favor conventional or conservation tillage in corn and soybean production.

The answer: in most areas examined in their study, differences in average returns were not statistically significant.

This was clearly the case for corn farmers in the 10 major corn producing states. Average per-acre returns to producers using different tillage practices during 1980 all fell within a relatively narrow range.

For midwestern soybeans, however, the average return to conventional tillage was significantly higher than the average no-till return—$155.54 per acre compared with $112.48. Yields made the difference. Conventional-till yields averaged 7 bushels an acre higher than no-till yields.

On the other hand, most soybean farmers using conservation tillage incurred significantly lower production costs for the inputs analyzed than did conventional-till soybean farmers.

Hanthorn and Duffy conclude that no single tillage practice can be called the most profitable shortrun strategy for most corn and soybean producers.

Returns to Corn and Soybean Tillage Practices, by Michael Duffy and Michael Hanthorn. (Published January 1984; 14 pages of text and tables; GPO Stock No. 001-000-04398-6; $1.25.)

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Responding to Jojoba's Lure

Separating promise from reality—that's one of the challenges facing a farmer tempted to respond to jojoba's lure, according to USDA economist Barbara Stucker of the Economic Research Service.

The promises make the perennial desert shrub sound like a budding giant, perhaps destined to follow the successful path of two other oilseed crops, soybeans and sunflowers. On the other hand, the realities could nip the developing jojoba industry in the bud, or at least keep it from growing much further.

Stucker and colleague James Fleming express cautious optimism. "Increased commercial acreage and continuing research in plant breeding, cultivation, and harvesting suggest future growth," notes Stucker. "However, there are still several obstacles to overcome before jojoba earns a widely accepted place in U.S. industry."

Jojoba (pronounced ho-ho'-ba) grows wild in desert areas of Arizona, California, and Mexico. According to some estimates, commercial U.S. plantations and test plots now cover about 30,000 acres in California, Arizona, and Texas. Most of this acreage was planted in the last 3 to 5 years, not enough time for the slow-maturing jojoba. Plants may take 5 years or more before they start producing harvestable seeds and 7 to 12 years before reaching peak yields.

Jojoba seeds, which look more like nuts or beans, yield about half their weight in an oily liquid that's almost an exact duplicate of sperm whale oil. The whale oil was once prized by U.S. industries for its ability to withstand high temperatures when lubricating gears and bearings. When the sperm whale was declared an endangered species in 1971, imports ended and synthetic substitutes had to be developed. For many uses, the substitutes fall short of the mark.

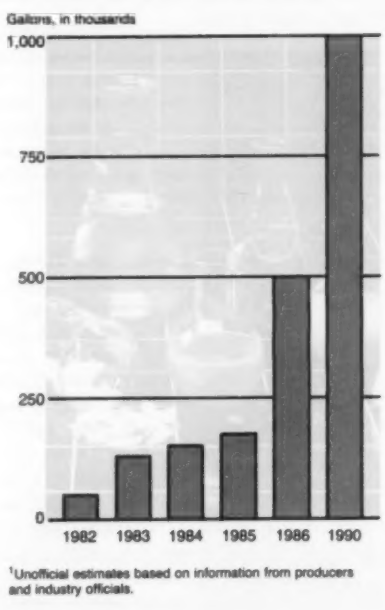
"Jojoba may be just what industry has been waiting for," says Stucker, "if it can be harnessed for commercial production." For now, jojoba is not a feasible alternative—commercial production is too small and prices too high. "Although producers are attracted by the high price, industrial buyers are scarce," she adds.

Larger production, lower prices, and greater assurance of availability and price stability might make the difference. For the potential producer, it's a gamble, and the uncertainties are not limited to the demand side. There are also serious questions about whether this wild evergreen can be successfully domesticated for large-scale commercial production.

First Commercial Harvest

The encouraging news is that 1983's midsummer harvest brought the first jojoba oil produced from planted fields, rather than wild shrubs.

Jojoba Oil Production May Reach One Million Gallons in 1990[1]



[1]Unofficial estimates based on information from producers and industry officials.

"Heavy rains throughout the Southwest in early 1983 increased yields from wild plants by 25 percent compared with 1982's harvest," says Stucker. "This increase, coupled with last year's first harvest from planted fields, should significantly boost jojoba oil production."

James Brown agrees. Brown is president of Jojoba Growers and Processors, Inc., of Apache Junction, Arizona. "The oldest of the plantings are now coming into their initial harvest years," he says. "By the late 1980's, around 30,000 tons of jojoba seed will be harvested from the current plantings."

According to Brown, U.S. jojoba acreage is divided among 75 to 100 growers whose plantations vary in size from half an acre to 5,000 acres. Some process their own seed into oil, while others sell their seed to processors.

Since the mid-1970's, about eight jojoba processing facilities have sprung up. They range in size from a small garage with a capacity to produce less than half a barrel of oil a day to Brown's firm, which produces about 25 barrels a day.

In addition to the U.S. crop, Brown estimates that about 10,000 acres of jojoba are planted in other countries, such as Mexico, Australia, South Africa, Brazil, Costa Rica, and Israel.

Assuming the price is right, all of this oil, and expectations of more to come, may stimulate greater commercial and industrial interest in jojoba.

"An unusually dry winter in 1981 claimed approximately one-third of the jojoba crop, driving the price of a gallon of oil well over $100," says Stucker. In 1982, jojoba was priced at $90 a gallon; in early 1983, $65; and recently, $45.

"In order for jojoba oil to be consumed in large volumes by the food and lubricant industry, it will be necessary for oil prices to drop to approximately half their current levels," Brown says.

This young commercial jojoba plantation is located in Desert Center, California. *Photograph © 1983 Kelley Dwyer—Jojoba Commodities Group.*

There's already some evidence that recent price downturns are having an impact, Stucker notes. "Price fluctuations cooled some of the commercial interest in the development of new jojoba products. Today, however, with lower prices and the potential for commercial plantations to provide a steadier supply, many companies are reactivating research projects for jojoba-based products."

Growing Jojoba

Jojoba is considered a relatively easy plant to grow. It is able to survive under harsh conditions, including low moisture, high temperatures, infertile soils, and freezing weather.

The ability of wild plants to survive under desert conditions often leads to the false conclusion that jojoba can prosper just about anywhere. Scientists discount this view, explaining that the necessary site conditions involve a delicate balance of soil, temperature, wind, and water.

In most cases, some type of irrigation is necessary—an expense that's held down because jojoba's water needs are greatest in late winter and spring. This dramatically reduces competition for water with other crops, whose needs are greatest in summer. Demand in the off-peak season can reduce irrigation costs.

Once in the ground, a jojoba plant will probably outlive a generation or two of growers. Plants often live 100 years or more, but the payoff isn't immediate. The grower may face a long wait before a new jojoba operation starts yielding any income.

"Presently, it takes 5 years for a jojoba plant to produce mature seed for harvest and 7 to 12 years for a plant to reach its productive capacity," says Stucker. "Some plants do bear seed after 3 years, but yields are very low, and commercial harvest is considered unprofitable. Researchers are looking into ways to accelerate maturation."

Another obstacle to greater production has been the harvesting methods.

"Currently, the majority of harvesting is done by manual labor, which yields 4 to 5 pounds of seed an hour. Researchers at the University of California are working on mechanical harvesting techniques using a blueberry harvester on pruned, 5-year-old plants. Machine harvest of 4 to 5 acres a day would be vastly superior to hand labor and less expensive in the long run," Stucker says.

Jojoba's Markets

Although commercial production is still in its infancy, jojoba already has a market.

Since 1979, over 200 products containing jojoba oil have been introduced, and other product uses are being tested. Current and potential uses include shampoos and hair conditioners, low-calorie salad and cooking oils, high-protein livestock feeds, cosmetics, pharmaceuticals, industrial lubricants, waxes, and food additives and preservatives.

Cosmetic companies use jojoba as a cosmetic base since it penetrates the skin rapidly and is not greasy to the touch. Pharmaceutical firms can use the oil as an antifoaming agent in penicillin manufacturing.

As a liquid, jojoba is able to withstand high pressures and temperatures, which makes it a valuable industrial lubricant. In the late 1970's, researchers found jojoba oil to be as much as four times more effective than whale oil in providing lubrication for automatic transmissions.

Jojoba oil can also be converted into a hard wax superior to most other waxes. It may be used in floor finishes, carbon paper, and in polishes for shoes, furniture, and automobiles.

Even the food industry has a market for jojoba wax. It retards shrinkage, reduces spoilage, slows aging, and retains flavor in foods. Candlemaking, plastics, adhesives, detergent, and chewing gum are also feasible outlets for the wax.

Potential uses don't stop there. Jojoba meal, a byproduct of oil production, contains 26 to 32 percent protein, plus carbohydrates and fiber, making it a possible animal feed.

Although the full promise of jojoba has yet to be demonstrated, interest is growing. According to Brown, few universities were conducting any research into jojoba when his company started in 1976. Now, research projects have sprouted at several institutions.

Genetic engineering may have a role to play here. As a dioecious plant—half the plants produce male flowers and the other half produce female flowers—jojoba's sex is not known until it bears flowers. Moreover, only females produce the seeds, but males are essential to pollination.

To overcome the risks associated with sex determination before planting, researchers are working to develop a plant that possesses both male and female flowers. They are also testing methods for pollinating jojoba by collecting pollen from males and mechanically blowing the pollen across fields of female plants. This technique has been successful with other orchard crops.

Jojoba flowers have no petals, nectaries, or scent glands to attract insects, so natural pollination depends on wind.

Economist Stucker can't guarantee that jojoba will live up to its promise, even with all this attention. Businessman Brown, however, has few reservations. After all, he's literally betting the farm on its success. □

[Based largely on information supplied by economists Barbara Stucker and James Fleming of the National Economics Division, Economic Research Service.]

Fewer Barrels, Fewer Bushels Travel U.S.-Mideast Routes

The days of "Food for Crude" may be over, at least in relation to the Middle East, says economist John Parker of USDA's Economic Research Service.

"In 1983, the eight Mideast OPEC countries provided only 4 percent of the petroleum used in the United States, down from their 24-percent share in 1977," says Parker.

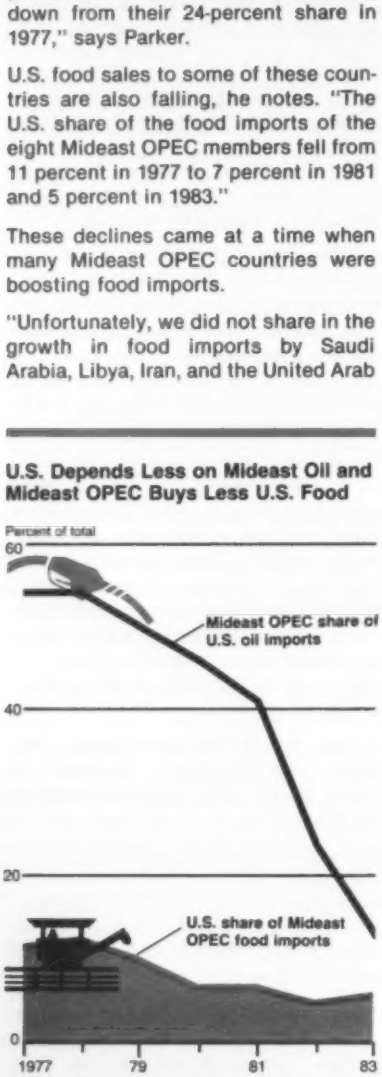
U.S. food sales to some of these countries are also falling, he notes. "The U.S. share of the food imports of the eight Mideast OPEC members fell from 11 percent in 1977 to 7 percent in 1981 and 5 percent in 1983."

These declines came at a time when many Mideast OPEC countries were boosting food imports.

"Unfortunately, we did not share in the growth in food imports by Saudi Arabia, Libya, Iran, and the United Arab Emirates in 1983," Parker says. Those U.S. competitors who have benefited include the European Community countries, Argentina, Brazil, and Thailand.

Iraq and Kuwait have been the exceptions. U.S. food exports to Iraq climbed to a record $350 million in 1983, mostly because of the American blended credit program for wheat and rice. Our agricultural exports to Kuwait increased 89 percent in 1983 to $68 million, mostly because of larger deliveries of wheat, feed grains, apples, and processed foods. The value of U.S. agricultural exports to all eight Mideast OPEC countries, including Algeria and Qatar, came to $1.1 billion last year.

U.S. Depends Less on Mideast Oil and Mideast OPEC Buys Less U.S. Food



Mideast OPEC includes Algeria, Iran, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, and United Arab Emirates.

Oil Imports Down

U.S. oil imports from these countries peaked at $29 billion in 1980, when total U.S. oil imports amounted to $64 billion. Total U.S. imports of crude petroleum declined to $45 billion in 1982 and only $39 billion in 1983. Both volume and price were down. Last year, Mideast OPEC suppliers provided less than 13 percent of U.S. oil imports, their lowest share in a decade, and just 4 percent of oil use after domestic U.S. production is figured in.

"We have virtually stopped importing petroleum from Libya, and purchases from other Mideast Arab countries have fallen way off," says Parker. "U.S. imports of Libyan petroleum dropped from $7.5 billion in 1980 to practically nothing in 1983."

Iran, too, was once a major U.S. supplier, providing $3 billion worth of oil in 1978. Following the 1979 seizure of the American Embassy in Teheran, U.S. oil imports from Iran tumbled to near zero, but rebounded to about $1 billion in 1983.

"Saudi Arabia and the United Arab Emirates were the major Mideast suppliers of U.S. oil imports in early 1983, but they ranked far behind Mexico and the United Kingdom," says Parker.

Saudi Arabia, in fact, once supplied more than one-fifth of total U.S. oil imports. That was in 1981, when the value of their petroleum exports to the United States reached $15 billion.

In 1983, however, the United States bought only $3 billion worth of oil from Saudi Arabia. "Price may have figured in the decline. The average price paid for petroleum imported from Saudi Arabia by American firms in early 1983 was $33 per barrel, compared with only $27 for Mexican oil," Parker adds.

New Suppliers

Mexico emerged as the major U.S. source of imported oil in 1982 and widened its lead last year. The value of U.S. petroleum imports from Mexico reached $7 billion in 1982, and advanced to $8 billion in 1983.

"The United Kingdom has also become a much more important U.S. supplier," Parker says, "with deliveries of crude oil valued at $5 billion in 1983."

The petroleum glut, he adds, has allowed the United States to shift strongly away from the "politically excitable suppliers to more business-minded ones."

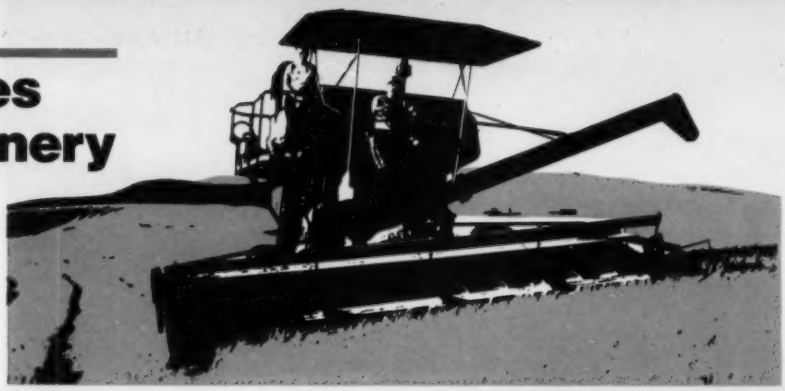
Some Mideast OPEC members, particularly Iran and Libya, may be partly retaliating by buying less food from the United States.

He also suggests another reason why some Mideast countries may be shying away from U.S. agricultural exporters. "The strong dollar has placed U.S. processed foods at a price disadvantage to those sold by our competitors," Parker says.

"For various reasons, we are being looked at less favorably by some Mideast importers and we are increasingly being treated as a supplier of last resort." □

[Based on information provided by economist John Parker, a Mideast analyst with the International Economics Division, Economic Research Service.]

Transition Times for Farm Machinery



More combines, tractors, and other farm machinery are expected to roll off the lots and onto the fields this year. Analysts are anticipating the first sales upturn in 5 years.

Since 1979, when sales hit record levels, business has gone steadily downhill. So far, the farm machinery industry has remained basically intact through it all, and conditions should improve as sales volume picks up.

However, some manufacturers and dealers are still struggling to survive, and the entire industry is going through a difficult transition. In the years ahead, further adjustments in production capacity and greater specialization by farm machinery manufacturers will probably be necessary.

The industry's financial difficulties over the last 4 years are reflected in the earnings statements of Deere & Co., International Harvester, and Massey-Ferguson, the three major full-line manufacturers of farm equipment. The figures suggest that the effects of the prolonged slump may linger long after a pickup in sales.

On the other hand, it's worth noting that Deere & Co. showed a profit throughout the 1980–83 period, and the firm remains sound. International Harvester and Massey-Ferguson suffered losses after 1979, but prospects for both firms look better than they did a year or two ago. Operations have been restructured, assets sold, management improved, and debts refinanced.

A review of financial records published by the three companies reveals that:

- Deere & Co. earnings (net income after expenses) slid from $310 million in its 1979 fiscal year to just $53 million in 1982. In 1983, earnings fell another 56 percent to $23 million.
- International netted $369 million in 1979 on sales of more than $7 billion. Since then, losses have totaled around $2.9 billion, including a $1.6-billion net loss in its 1982 fiscal year. The 1983 earnings statement showed a net loss of $485 million.
- Massey-Ferguson posted a loss of $41 million through the first 9 months (February 1 to October 31) of its 1983 fiscal year—the best news for the company in 4 years. Net losses from 1980 to 1982 added up to $833 million. In 1979, its last profitable year, earnings were reported at $37 million.

Declining Sales Take a Toll

The sales receipts of the major manufacturers didn't drop as precipitously as net earnings, largely because of higher machinery prices. Prices for tractors and other self-propelled machinery increased 9.8 percent between 1979 and 1983. Prices for other machinery and farm implements rose 9.3 percent.

These price increases were relatively modest compared with increases of prior years, but the moderation was not enough to stem the plunge in sales volume. Meanwhile, profits were caught in the squeeze between rising fixed costs and weakening demand.

Between 1979 and 1983, unit sales of farm machinery declined dramatically; tractors, down 51 percent; combines, down 63 percent; forage harvesters, down 76 percent; hay balers, down 54 percent.

Until recently, inventories were mounting, but a wave of rebates and sales incentives, coupled with reduced factory production, has trimmed the backlog. During the past few years, manufacturers have shut down plants or eliminated shifts, slashed capital expenditures, refinanced loans from creditors, and temporarily laid off workers.

International Harvester, possibly the most severely shaken of the major manufacturers, now employs fewer than half as many workers as it did in 1979. International, Massey-Ferguson, and Allis-Chalmers reduced capital expenditures by 54 percent, 38 percent, and 65 percent, respectively, in recent years.

In an effort to better cope with the situation, some companies have reportedly discussed joint venture and joint manufacturing agreements. To date, only marginal changes have resulted from these discussions, such as the sale of certain divisions to other companies.

A Depressed Farm Economy

There are several reasons for the current financial plight in the industry.

Earnings Plunge or Turn to Losses as Farm Machinery Manufacturers Weather the Sales Slump

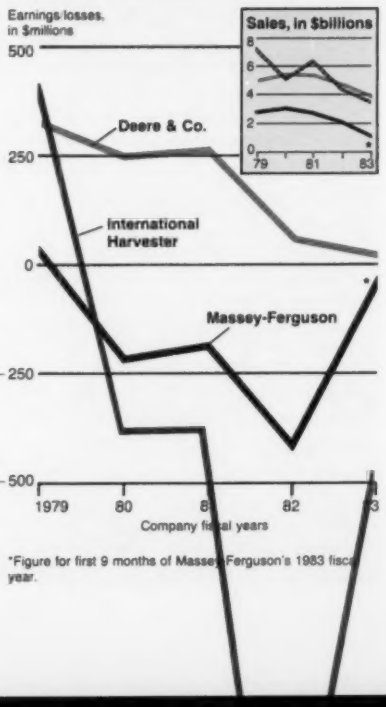


*Figure for first 9 months of Massey-Ferguson's 1983 fiscal year.

One is the depressed state of the agricultural economy over the last few years.

Historically, farmers make machinery purchases out of net cash income, whether current or anticipated. Disappointing returns from farming, growing debts, rising production expenses, and higher costs of living have kept many farmers in a precarious cash flow position, unable or unwilling to take on additional debt. Meanwhile, declining land values, higher interest rates, and tighter credit have made it more expensive and, in many cases, more difficult to obtain the financing needed to purchase big-ticket items, such as tractors and combines.

Farm debt has continued to climb, while real farm equity has dropped for 4 consecutive years. In 1982, farmers' income return on equity capital fell to its lowest level in 50 years. One result is that farmers have been delaying real estate improvements and machinery purchases, as evidenced by a 43-percent drop in the ratio of annual capital formation to net cash income from 1979 to 1983.

Acreage reduction programs to relieve commodity surpluses have probably contributed to delayed purchase decisions, as has uncertainty about future income, exports, interest rates, and farm programs. By most indications, farmers are not convinced that recent improvements in crop prices and cash income assure a sustained, general recovery in the farm sector.

Beyond the economics of agriculture are longer term trends in farm numbers, farm size, and specialization. The machinery industry is serving a limited and shrinking U.S. agricultural market. Fewer, larger, and more specialized farms have fed the trend toward fewer but larger and more specialized pieces of machinery.

The average horsepower of new tractors increased from 63 in 1965 to roughly 96 hp. in 1983. Meanwhile, the number of grain combines and tractors on U.S. farms fell by 364,000 units and 122,000 units, respectively.

The industry has responded gradually to the changing farm economics and farm structure. The movement toward larger, more efficient farm machinery has been going on for some time, but the industry also saw an opportunity to push ahead with a buildup in production capacity.

Strong export growth throughout the 1970's and relatively high income levels, particularly in the mid-1970's, led to expectations of strong farm profits in the years ahead. Many manufacturers opted for a marketing strategy based on a full product line of diverse machinery items to capture a greater market share of what was perceived as a still-expanding market. Record sales in 1979 seemed to support these decisions.

Instead, the U.S. embargo on grain sales to the Soviet Union, the strength of the dollar, high interest rates, the length and depth of the global recession, and the low commodity prices prevailing in the early 1980's resulted in drastic sales declines.

Burdened by Overcapacity

The deepening slump in machinery sales after 1979 left the industry with

Better Sales Ahead

Prospects for large spring plantings and signs of some improvement in the farm economy are fanning the hopes of a troubled farm machinery industry.

This is the year, some analysts say, that farmers will release much of the pent-up demand to replace aging equipment. The lure includes factory discounts and special financing, reduced maintenance and downtime, more acres per gallon, the latest technology, even the smell of new upholstery and the appeal of brightly painted metal.

If farmers respond—and USDA's projections suggest they probably will—enough combines, tractors, and other equipment will roll off the lots to chalk up the first increase in sales volume since 1979. Unit sales of machinery may be up more than 10 percent.

Some industry forecasters are even more optimistic, with many manufacturers predicting sales increases of 15 to 20 percent. Whatever the case, a large portion of the machines that are sold will come out of current inventories, so production lines aren't likely to shift back into high gear anytime soon.

Also, both private and government analysts agree that any improved sales performance will be heavily influenced by crop prices, interest rates, export developments, and farmers' income expectations as the year progresses.

Many farmers have been unable or unwilling to take on additional debt.

excess capacity and growing inventories. As of December 1983, total tractor and combine inventories both added to approximately a 300-day supply. Factory rebates, discounts, and other sales incentives haven't been enough to bring inventories down to normal levels, although the industry did make some progress in reducing inventories last year.

To boost sales, J. I. Case, a maker of large tractors, recently announced a radically new rebate program. In conjunction with the United Auto Workers, it offered a $3,000 rebate over a 2-month period to buyers of selected machinery. This joint venture was possible because of wage concessions made by the union.

Reduced sales and large inventories have translated into temporary and permanent plant shutdowns. All major manufacturers halted production lines for at least 30 days last year. Last fall, the industry was turning out 264 tractors a day, just 34 percent of production capacity.

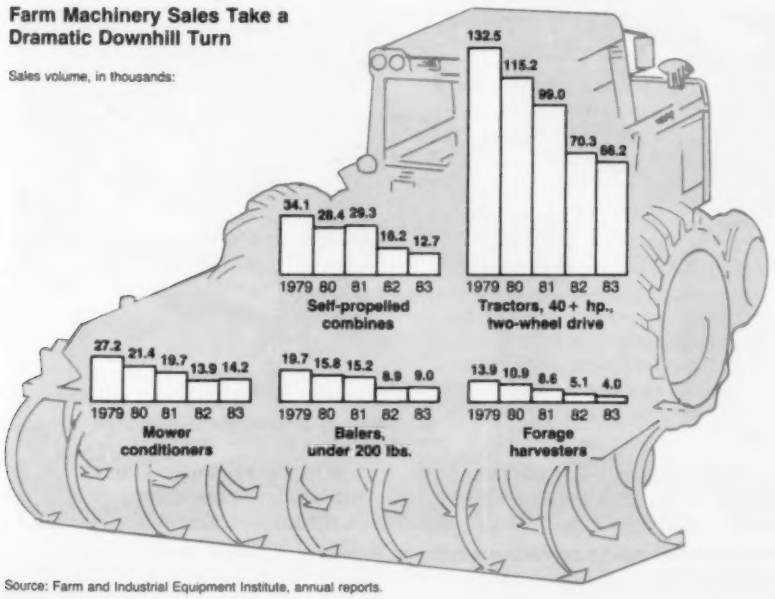
The apparent industry strategy is to limit output, and thereby control production costs, reduce inventories, and extend dealer liquidity. The Farm Equipment Manufacturers Association reported that 188 dealerships closed down in the first half of 1983. Since 1979, more than 1,000, or around a tenth of all dealers, have gone out of business.

What's Ahead?

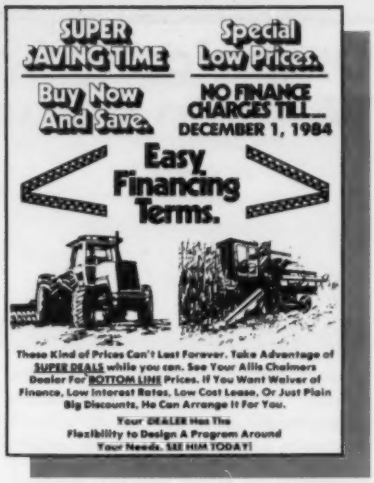
Given the unstable financial conditions and structural adjustments in the farm sector, many experts say it is unlikely that the machinery industry will experience another sales boom matching the one that occurred in the late 1970's.

Farm Machinery Sales Take a Dramatic Downhill Turn

Sales volume, in thousands:



Source: Farm and Industrial Equipment Institute, annual reports.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As farms continue to become larger in size and fewer in number, the overall demand base for machinery will decline. Demand for certain types of large machinery will be boosted by these changes, but not enough to ensure adequate profit margins for manufacturers adhering to a strategy of product diversity.

In addition, the U.S. farm machinery industry is becoming less cost competitive relative to producers in some other countries, such as Japan and Germany. As a result, there is growing foreign competition for the American market, particularly in smaller tractors.

Given these prospects, the U.S. farm machinery industry can be expected to pursue product specialization. Some manufacturers have begun to shift the emphasis of their organization in the direction of specializing in the production of items that are innovative and cost effective. They will buy other pieces of equipment for their product line from more specialized suppliers.

As manufacturers streamline operations and trim product offerings, brand loyalty is becoming unprofitable for many dealers who feel they need to offer a diverse product line to their customers. To remain in business, many dealers are examining and, in some cases, severing traditional relationships with individual manufacturers. However, this transitional stage from product diversity to product specialization is likely to be a long-term process. □

[Written by economist Carlos Sisco of the Natural Resource Economics Division, Economic Research Service.]

Organically Speaking, Western Europe Is Top Seed

Market days are still a tradition in Western Europe. Vendors bring fresh fruit, vegetables, and meats from nearby farms to designated city squares where shoppers often find several stands selling organically grown food.

USDA defines organic farming as food production largely without synthetically compounded fertilizers, pesticides, growth regulators, and livestock and poultry feed additives.

Organic farming has a long history in Europe and has been increasing in the last 15 years because of the characteristics of European agriculture, consumer concerns about healthy diets, product promotion, and the existence of "schools" of organic farming based on different philosophical concepts and technical practices. Although strictly organic techniques were applied to less than 1 percent of farmland in the 10 countries of the European Community (EC) in 1982, the impact on food retailing and consumer attitudes is widespread.

One factor tending to favor organic farming in Europe is the smaller average farm size, compared with farms in the United States. A 60-to-80 acre farm is typical in Europe, while U.S. farms average more than 400 acres. Small farms can more easily produce a mixture of crops and livestock, a practice that lends itself best to organic farming because of the availability of fertilizers from animal manures and organically grown feeds.

Farms in Europe have remained small for both historical and policy reasons. Government protection of agriculture in Germany, for example, dates from the 1880's and has allowed small farms to remain viable. Laws limiting the size of livestock farms exist in Switzerland and Finland. Sweden has a number of policy measures that "protect the family farm," including limiting the number of acres per farm. Denmark and France have similar limitations, although these are rarely applied in France.

The rising cost of farm chemicals, influenced by increased energy prices, has also induced some farmers to turn to organic techniques. In many cases, yields are comparable to those achieved with nonorganic farming methods.

Organic Organizations

In Europe, there are a variety of organizations that support organic farming from production through retailing. Activities include quality control, labeling and promotion, research, and dissemination of information to group members who include farmers, processors, retailers, and consumers. While the groups cross national boundaries, some are more prevalent in one country than another and a few have a following in the United States:

- Bio-Dynamic farming is the largest organization, with members throughout Europe and the United States. Products are marketed under the "Demeter" label in Europe. Research centers exist in Germany, Sweden, Switzerland, Austria, and New York and California. The group's philosophy, known as "Anthroposophy," emphasizes the unity of the spiritual and material in man and is reflected in the desire for healthful agricultural practices.

- Organic-Biological, the next largest group, with a following in Holland, Germany, and the Scandinavian countries, provides extension and commercial trade services for its members. Its trademark is "Bioland." The group has its own philosophy on the role of diet in assuring good health.

- Lemaire-Boucher is the largest group in France. Members are supplied with "Lemaire" products, such as fertilizer from marine algae. The resulting food products are sold under the house label. The group also contracts with many wheat millers and bakers to use Lemaire-grown grains and certain processing practices to guarantee the quality of the product produced.

Shops featuring organic products are common, especially in northen Europe. *Photo by Marshall Cohen.*

Organic products are often found in European fruit and vegetable markets, such as this one in England. *Photo by Marshall Cohen.*

• Nature et Progres (Nature and Progress) is the second largest group in France, with an active membership of both consumers and producers.

• The Howard-Balfour system is particularly widespread in the United Kingdom, while Macrobiotic has a following in Northwestern and central Europe.

Many of these groups organize nature walks, discussions, and other activities that touch a much larger public than their immediate members.

Sophisticated marketing techniques in Europe, particularly specialty shops and "organic" labeling, have helped widen the use of the products. "La Vie Claire" in France, for example, was founded over 30 years ago and currently has more than 200 stores. The "Bioval" label is another important organic trademark in France. There are 1,800 independent diet shops in France carrying these products: 500 are in the Paris region alone. "Lima" in Belgium is another processing and marketing organization which sells organic products throughout Europe.

Organic products are more common in northern European shops than in southern Europe. The widespread existence of family gardens in southern Europe, many of which are organic, may account for much of the apparent difference.

For consumers, health and diet concerns as well as the quality and taste of food have been the driving factors in awakening interest in organically grown products. The 1980 consumer boycott of French veal in nine European nations was indicative of the extent of concern. High levels of synthetic hormones discovered in veal exported for baby food from France to Italy gave the initial impetus to the boycott. Both countries are members of the EC and are regulated by its Common Agricultural Policy (CAP). Public reaction forced stricter enforcement of EC regulations forbidding the use of hormones in animal production.

U.S. Organics

An estimated 25,000 U.S. farms, 1 percent of those with agricultural sales of $1,000 or more, produce exclusively with organic methods, while many more use some organic techniques.

The farm structure in the United States presents difficulties which, for the most part, do not exist in Europe. The last 20 years, for example, have seen an increase in average farm size here and a switch from mixed crop-livestock operations to specialized ones which lack the fertilizer and natural feed to farm or raise livestock organically. Large farm size also may inhibit the use of labor-intensive organic techniques.

The economic advantages of the smaller, mixed crop and livestock farms were enhanced as energy prices increased in the 1970's. These farms can more readily substitute organic techniques for chemicals. Some larger units have also adopted mixed crop and livestock farming and organic methods.

Marketing of organic foods appears to be more advanced in Europe than in the United States, although strictly comparable data are difficult to obtain. Many U.S. organic products are sold without special labeling or marketing and relatively few specialty shops exist. The West Coast shows the greatest interest in organic products in the United States.

Organic products face some of the same problems of legal definition in Europe as they do here. Only Oregon, Maine, and California have standards for organic labeling. Efforts at developing a nationwide certification standard for the United States were abandoned in 1973.

In the United States, 22 regional organizations exchange information among members, and certify, inspect, market, and distribute organically produced crops. The philosophical aspects of organic farming are stressed less in these groups than in Europe.

In Europe, there is both private and government involvement in certification and labeling. In France, producers, processors, and sales outlets have recently joined in an association which has obtained the legal right to set standards for labeling products as organic and for certifying farms providing organically grown produce. Among the other EC countries, only Belgium and Germany have organic labeling regulations set by the government. However, the regulations do not extend to farm certification. To date, the issue of organic labeling has not been addressed by the EC parliament, although a bill has been proposed.

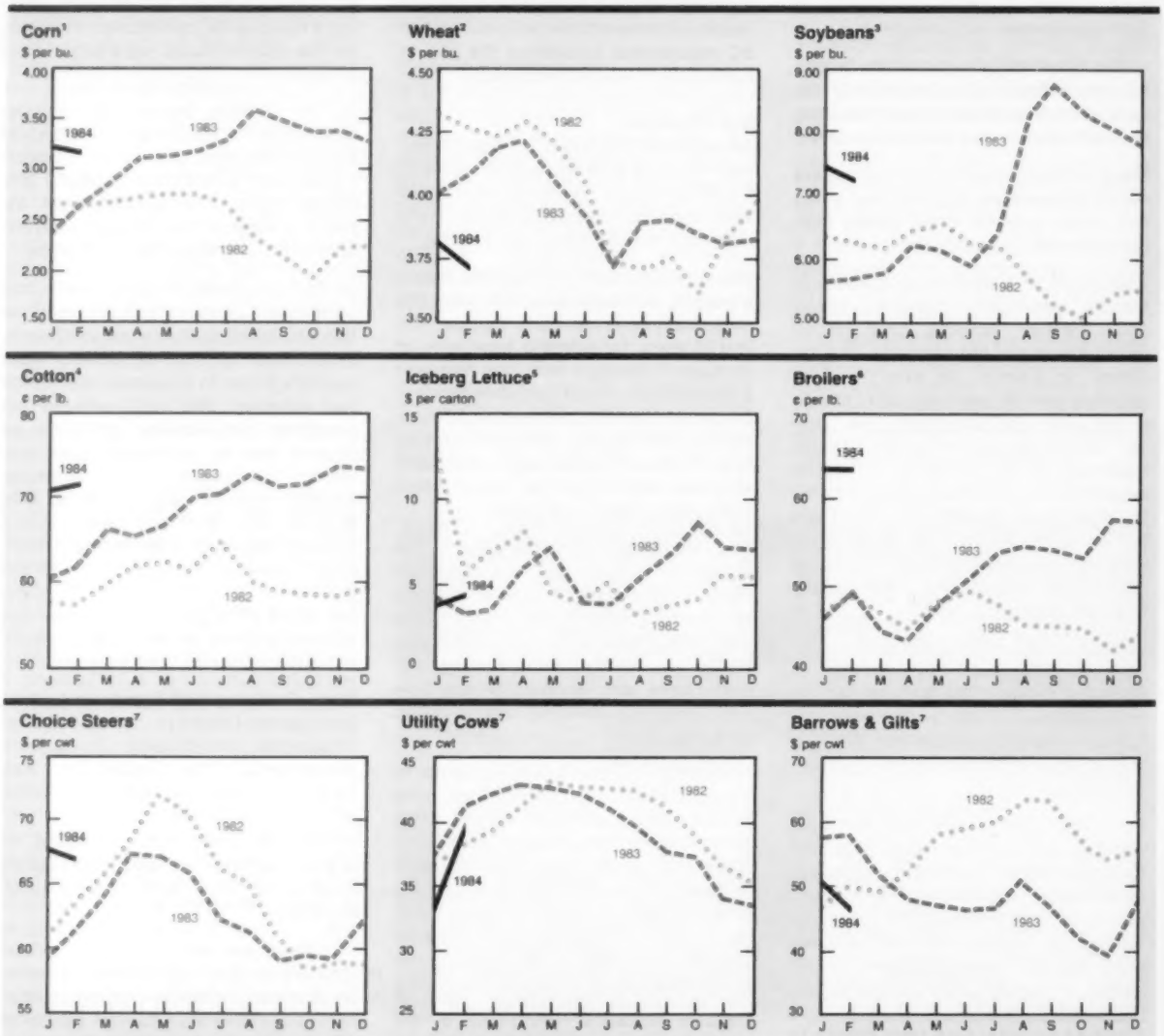
Many European and American organic farm groups belong to the International Federation of Organic Agriculture Movements. The federation was formed in 1972 and has 80 member organizations in 30 countries. It promotes the aims and principles of organic agriculture, and coordinates organic farming developments internationally. □

[Written by economist Stephen Sposato of the International Economics Division, Economic Research Service. Sposato lived in Europe for about 10 years and worked on an organic farm in Belgium.]

Monthly Price Monitor

USDA's index of farm prices declined 1.4% from January to February. The all-crops index dropped 2%, while the livestock index slipped less than 1%. Wholesale markets (below) showed small to moderate declines for corn, wheat, and soybeans—each hit its lowest price in 8 or 9 months. Cotton gained less than a penny, and lettuce rose 30¢. In the livestock area, prices for choice steers and barrows and gilts dropped in February.

Broiler prices held steady, and utility cows jumped to nearly $40 per cwt. Compared with year-earlier levels, barrows and gilts were down more than $11 per cwt.



[1]No. 2 yellow, Central Illinois. [2]No. 1 HRW, Kansas City. [3]No. 1 yellow, Central Illinois. [4]SLM 1-1/16" spot market price. [5]Standard carton 24's, California-Arizona. [6]Wholesale, New York. Monthly average prices since May 1983 may not be strictly comparable with prices for previous months. [7]Omaha.

Breadwinners of the Food and Fiber System

Farming employs about 3% of the American workforce, but that's just the tip of the food and fiber system. Millions of U.S. workers are engaged in processing, manufacturing, transporting, exporting, retailing, preparing, and serving farm-based products—from food to animal feed, from textiles to leather, from flowers to tobacco, and from milk and fruit juices to beer, wine, and spirits.

The food and fiber system provides jobs and income for farmers and florists, restaurant cooks and table waiters, truckers and grocers, brewers and food packagers, underwear makers and shoemakers, clothing sales people and cigarette machine repairers, and many others.

Economists Gerald Schluter and Bill Edmondson of USDA's Economic Research Service estimate that around 22% of the U.S. labor force is employed in the food and fiber system. In raw numbers, that's well over 20 million.

By state, California is number one, with an estimated 2.5 million people working in the food and fiber sector. New York follows with almost 1.6 million, and Texas is third with 1.4 million. In terms of percentages, Nebraska and North Carolina lead the nation, with nearly 32% of each state's labor force employed in food and fiber occupations; North Dakota follows closely behind at 30%.

"This is not a precise head count," cautions Edmondson. "We had to make several assumptions, and we probably overestimated for some industries and states and underestimated for others. But our methodology is pretty solid. The figures are based on the best data sources we could find and, in our judgment, they aren't far off the mark."

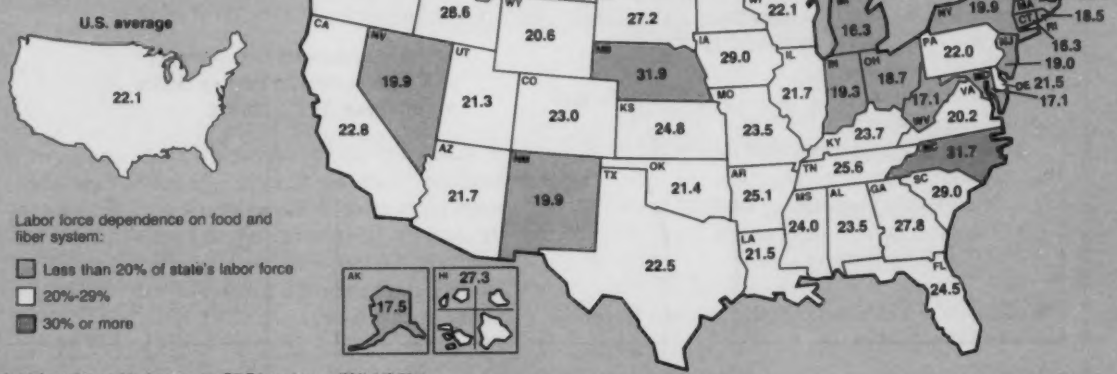
Here are Edmondson and Schluter's state-by-state estimates of the number of workers employed in the food and fiber system. The map at the bottom of the page puts those figures in a different context: food and fiber system employment as a percentage of each state's total labor force. All figures are for 1979.

State By State, the Food and Fiber System Provides Jobs for Tens of Thousands, Hundreds of Thousands, Even Millions of Workers*

State	Number of workers in food & fiber system	State ranking by number of workers
Alabama	381,560	21
Alaska	31,520	50
Arizona	227,980	34
Arkansas	239,520	32
California	2,501,900	1
Colorado	319,040	26
Connecticut	257,580	30
Delaware	59,000	47
Florida	938,930	7
Georgia	649,560	11
Hawaii	108,870	39
Idaho	120,700	38
Illinois	1,159,400	5
Indiana	503,460	16
Iowa	415,780	19
Kansas	296,850	27
Kentucky	369,920	23
Louisiana	361,740	24
Maine	131,520	35
Maryland	357,480	25
Massachusetts	571,360	12
Michigan	701,870	9
Minnesota	486,210	18
Mississippi	237,100	33
Missouri	539,060	13
Montana	80,990	45
Nebraska	246,040	31
Nevada	71,130	46
New Hampshire	93,280	41
New Jersey	673,000	10
New Mexico	108,930	40
New York	1,594,600	2
North Carolina	853,170	8
North Dakota	91,750	42
Ohio	940,320	6
Oklahoma	272,880	28
Oregon	267,390	29
Pennsylvania	1,166,600	4
Rhode Island	83,220	44
South Carolina	379,120	22
South Dakota	91,580	43
Tennessee	506,360	15
Texas	1,407,900	3
Utah	124,460	37
Vermont	44,550	49
Virginia	500,460	17
Washington	397,000	20
West Virginia	127,950	36
Wisconsin	526,690	14
Wyoming	46,100	48
United States	**22,743,000**	—

Nearly One-third of the Labor Force Is Employed in the Food and Fiber System in Some States

Percentage of state's workers employed in food and fiber jobs:



*For further information on this data, contact Bill Edmondson at (202) 447-7340

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